

ments are available, multiplied by (ii) nine. (*Section 4.07.*) The Company's obligation to comply with this covenant may terminate under certain circumstances. (See "Prepayment at the Option of the Holders".)

At March 31, 1993, the aggregate Indebtedness of the Restricted Group would have been approximately \$3,211,811,000 after giving effect to the sale of the Securities and the June Senior Debt Securities and the application of the net proceeds therefrom. The Operating Cash Flow of the Restricted Group (giving pro forma effect to the designation of the SCR Subsidiaries as Restricted Subsidiaries as if such designation had occurred on January 1, 1993) would have been \$130,265,000 for the three month period ending March 31, 1993. Accordingly, the multiple of pro forma aggregate Indebtedness of the Restricted Group to four times such Operating Cash Flow would have been 6.16 at March 31, 1993. (See "Use of Proceeds".)

Investments in Unrestricted Subsidiaries. The Note Indenture provides that no member of the Restricted Group will make any loan or transfer of property to or investment in an Unrestricted Subsidiary (other than (i) the provision of goods and services to an Unrestricted Subsidiary if such goods and services are billed to an Unrestricted Subsidiary on the basis of the provider's cost therefor and (ii) advances to an Unrestricted Subsidiary in the ordinary course of business by the Restricted Group if the interest payable on such advances is generally consistent with the Company's cost of borrowings under its credit facilities) unless, immediately after and giving effect to such loan or investment on a pro forma basis, the Restricted Group would be able to incur an additional One Dollar (\$1.00) of Indebtedness without violating the covenant in the Note Indenture on limitation of Indebtedness described above under "Limitation on Indebtedness", as determined for the fiscal quarter most recently completed for which financial statements are available at the date of such loan, transfer or investment. (*Section 4.08.*) The Company's obligation to comply with this covenant may terminate under certain circumstances. (See "Prepayment at the Option of the Holders".)

Transactions with Affiliates. The Note Indenture provides that the Company will not, and will not permit any Restricted Subsidiary to, enter into any transaction (including, without limitation, the purchase, sale, lease or exchange of any property or the rendering of any service) with any holder of 5% or more of any class of capital stock of the Company or with any affiliate of the Company or of any such holder, on terms that are less favorable to the Company or such Restricted Subsidiary, as the case may be, than those which might be obtained at the time of such transaction from a person who is not such a holder or affiliate. This covenant will not limit, or be applicable to, (i) Exempt Repurchases, (ii) transactions between the Company and a Subsidiary or between Subsidiaries, (iii) transactions pursuant or relating to Restricted Stock Purchase Agreements (see "Management – Executive Compensation") or (iv) the payment of reasonable and customary regular fees to directors of the Company who are not employees of the Company. (*Section 4.09.*)

Merger or Sales of Assets. The Note Indenture provides that the Company may not merge into or consolidate with another corporation or sell or lease all or substantially all of its assets to another corporation unless (i) either (A) the Company is the surviving corporation, or (B) the resulting, surviving or transferee corporation is organized under the laws of a state of the United States or the District of Columbia and agrees to pay promptly when due the principal of and premium, if any, and interest on the Notes, and to assume, perform and observe all the covenants and conditions of the Note Indenture, and (ii) immediately after and giving effect to such transaction, no Event of Default has occurred. (*Section 11.01.*)

Limitation on Liens. The Note Indenture provides that the Company will not, and will not permit any Restricted Subsidiary to, create, incur or assume any Lien on any Principal Property or any shares of capital stock or Indebtedness of any Restricted Subsidiary without making effective provision for all of the Notes and all other amounts due under the Note Indenture to be directly secured equally and ratably with (or prior to) the obligation or liability secured by such Lien unless, at the time of such creation, incurrence or assumption and, after giving effect thereto, the aggregate amount of all Indebtedness so secured does not exceed five times Annualized Cash Flow; provided, however, that if all Liens (other than Liens created pursuant to this provision or the comparable provision of the 2005 Debenture Indenture, the 2013 Debenture Indenture or the Indentures relating to the June Senior Debt Securities) on Principal Property or shares of capital stock or Indebtedness of a Restricted Subsidiary which secure Indebtedness of the Company or any Restricted Subsidiary are released, then (i) all then existing Liens so created (together with all then

existing Liens created pursuant to the comparable provision of the 2005 Debenture Indenture, the 2013 Debenture Indenture and the Indentures relating to the June Senior Debt Securities) shall be automatically released and (ii) the Trustee shall be authorized to execute and deliver to the Company any documents requested by the Company which are required to evidence the release of such Liens. (*Section 4.11.*) The Company's obligation to comply with this covenant may terminate under certain circumstances. (See "Prepayment at the Option of the Holders".)

Under the terms of the Note Indenture, the foregoing limitation does not apply to (i) Liens securing obligations of the Company to reimburse any bank or other person in respect of amounts paid under letters of credit, acceptances or other similar instruments or (ii) Liens securing Indebtedness on the assets of any entity existing at the time such assets are acquired by the Company or any of its Restricted Subsidiaries, whether by merger, consolidation, purchase of assets or otherwise; *provided* that such Liens described under clause (ii) above (x) are not created, incurred or assumed in connection with, or in contemplation of, such assets being acquired by the Company or any of its Restricted Subsidiaries and (y) do not extend to any other Principal Property or assets of the Company or any of its Restricted Subsidiaries.

At March 31, 1993, the aggregate Indebtedness of the Restricted Group secured by Liens would have been approximately \$959,675,000 after giving effect to the sale of the Securities and the June Senior Debt Securities and the application of the net proceeds therefrom. The Operating Cash Flow of the Restricted Group (giving pro forma effect to the designation of the SCR Subsidiaries as Restricted Subsidiaries as if such designation had occurred as of January 1, 1993) would have been \$130,265,000 for the three months ended March 31, 1993. Accordingly, the ratio of pro forma Indebtedness of the Restricted Group secured by Liens to pro forma Annualized Cash Flow of the Restricted Group would have been 1.84 to 1 as of March 31, 1993. (See "Use of Proceeds".)

Certain Definitions

"Annualized Cash Flow" means Operating Cash Flow for the latest fiscal quarter for which financial statements are available multiplied by four.

"Company" means Continental Cablevision, Inc., a Delaware corporation.

"Exempt Repurchases" mean repurchases by the Company at any time or from time to time of up to 751,305 shares of its Common Stock which are subject to the 1998-1999 Share Repurchase Program, provided that the Company has received prior to any such Exempt Repurchase an opinion of an investment banker knowledgeable in the communications industry (who may be the Company's investment banker) that the price per share of Common Stock paid pursuant to any such Exempt Repurchase does not exceed the greater of (A) the dollar amount that a holder of Common Stock would then receive per share of Common Stock upon a sale of the Company as a whole pursuant to a merger or sale of stock or, if greater, the dollar amount a holder of Common Stock would then receive per share of Common Stock derived from the sale of the Company's assets and subsequent distribution of the proceeds therefrom (net of taxes including corporate, sales and capital gain taxes in connection with such sale of assets), in each instance less a discount of 22.5% or (B) the net proceeds which would be expected to be received by a shareholder of the Company from the sale of a share of the Company's Common Stock in an underwritten public offering held at the time any such Exempt Repurchase is to occur after being reduced by pro forma expenses and underwriting discounts unless the Common Stock is publicly traded and such expenses and underwriting discounts would not be incurred in connection with an underwritten public sale of a shareholder's non-registered shares in the opinion of the investment banker; provided, further, that no such opinion of an investment banker will be required for repurchases of shares of Common Stock which are subject to the 1998-1999 Share Repurchase Program to the extent that the aggregate purchase price paid therefor in any calendar year does not exceed \$10,000,000.

"Indebtedness" means (without duplication), with respect to any person, any indebtedness, contingent or otherwise, in respect of borrowed money (whether or not the recourse of the lender is to the whole of the assets of such person or only to a portion thereof), or evidenced by bonds, notes, debentures or similar instruments or representing the balance deferred and unpaid of the purchase price of any property (exclud-

CONTINENTAL CABLEVISION

EXHIBIT C-3

FEDERAL COMMUNICATIONS COMMISSION
Docket No. MM 93-215

GTE Loan Covenants

Registration No. 33-

 SECURITIES AND EXCHANGE COMMISSION
 Washington, D.C. 20549

 FORM S-3
 REGISTRATION STATEMENT
 Under
 THE SECURITIES ACT OF 1933

GTE CORPORATION
 (Exact name of registrant as specified in charter)

New York
 (State of Incorporation)

13-1678633
 (I.R.S. Employer
 Identification No.)

ONE STAMFORD FORUM, STAMFORD, CONNECTICUT 06904
 (203-965-2000)
 (Address and telephone number of principal executive offices)

NICHOLAS L. TRIVISONNO
 One Stamford Forum
 Stamford, Connecticut 06904
 (203-965-2000)
 (Name, address and telephone number of agent for service)

Approximate date of commencement of proposed sale to the public: From time to time after the effective date of the Registration Statement.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box. ()

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box. (X)

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities Being Registered	Amount to be Registered	Proposed Maximum Offering Price Per Unit	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Debt Securities	\$1,500,000,000 (1)	101%	\$1,515,000,000 (1)	\$378,750

(1) In U.S. dollars or the equivalent thereof in the case of foreign currencies or currency equivalents.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with
 (REMAINDER OF PAGE FOLLOWS)

premium, if any) or interest so becoming due on Securities of that series until such sums shall be paid to such persons or otherwise disposed of as herein provided and will promptly notify the Trustee of such action, or any failure (by it or any other obligor on such Securities) to take such action.

(c) Anything in this Section to the contrary notwithstanding, (i) the agreement to hold sums in trust as provided in this Section is subject to the provisions of Section 11.05, and (ii) the Corporation may at any time, for the purpose of obtaining the satisfaction and discharge of this Indenture or for any other purpose, pay, or direct any paying agent to pay, to the Trustee all sums held in trust by the Corporation or such paying agent, such sums to be held by the Trustee upon the same terms as those upon which such sums were held by the Corporation or such paying agent; and, upon such payment by any paying agent to the Trustee, such paying agent shall be released from all further liability with respect to such money.

SECTION 4.04. The Corporation, whenever necessary to avoid or fill a vacancy in the office of Trustee, will appoint, in the manner provided in Section 7.10, a Trustee, so that there shall at all times be a Trustee hereunder.

SECTION 4.05. The Corporation will not, while any of the Securities remain outstanding, create, or suffer to be created or to exist, any mortgage, lien, pledge, security interest or other encumbrance of any kind upon any property of any character of the Corporation whether now owned or hereafter acquired or upon any of the income or profits therefrom unless it shall make effective provision whereby the Securities then outstanding shall be secured by such mortgage, lien, pledge, security interest or other encumbrance equally and ratably with any and all obligations and indebtedness thereby secured so long as any such obligations and indebtedness shall be so secured; provided, however, that

nothing in this Section shall be construed to prevent the Corporation from creating or from suffering to be created or to exist, any mortgages, liens, pledges, security interests or other encumbrances, or any agreements, of the following character:

(1) Purchase money mortgages, or other purchase money liens, pledges or encumbrances of any kind upon property hereafter acquired by the Corporation, or mortgages, liens, pledges, security interests or other encumbrances of any kind existing on such property at the time of the acquisition thereof, or conditional sales agreements or other title retention agreements with respect to any property hereafter acquired; provided, however, that no such mortgage, lien, pledge, security interest or other encumbrance, and no such agreement, shall extend to or cover any other property of the Corporation;

(2) The replacement, extension or renewal of any such mortgage, lien, pledge, security interest or other encumbrance, or of any such agreement, permitted by the foregoing clause (1), or the replacement, extension or renewal (without increase) of the indebtedness secured thereby;

(3) Liens for taxes or assessments or governmental charges or levies; pledges or deposits to secure obligations under workmen's compensation laws or similar legislation; pledges or deposits to secure performance in connection with bids, tenders, contracts (other than contracts for the payment of money) or leases to which the Corporation is a party; deposits to secure public or statutory obligations of the Corporation; materialmen's, mechanics', carriers', workmen's, repairmen's or other like liens in the ordinary course of business, or deposits to obtain the release of such liens; deposits to secure surety and appeal bonds to which the Corporation is a party; other pledges or deposits for similar purposes in the ordinary course of business; liens created by or resulting from any litigation or legal proceeding which at the time is currently being contested in good faith by appropriate proceedings; leases made, or existing on property acquired, in the ordinary course of business; landlord's liens under leases to which the Corporation is a party; zoning restrictions, easements, licenses, restrictions on the use of real property or minor irregularities in title thereto, which do not materially impair the use of such property in the operation of the business of the Corporation or the value of such property for the purpose of such business; the lien of the Trustee described in Section 7.06 hereof; or

(4) Subordination of the Corporation's rights with respect to any indebtedness owing to the Corporation by a Subsidiary to the rights of any creditor of such Subsidiary for money or credit advanced to such Subsidiary.

SECTION 4.06. The Corporation will not, while any of the Securities remain outstanding, consolidate with, or merge into, or merge into itself, or sell or convey all or substantially all of its property to, any other corporation unless the provisions of Article Ten hereof are complied with.

If upon any such consolidation or merger, or sale or conveyance, any of the property of the Corporation would thereupon become subject to any mortgage, security interest, pledge or lien, the Corporation prior to such consolidation, merger, sale or conveyance will secure the outstanding Securities, or cause the same to be secured, equally and ratably with the other indebtedness or obligations secured by such mortgage, security interest, pledge or lien so long as such other indebtedness or obligations shall be so secured; provided, however, that the subjection of property of the Corporation to any mortgage, security

interest, pledge or lien of the character referred to in clauses (1), (2), (3) and (4) of Section 4.05 shall be deemed excluded from the operation of this Section and shall not require that any of the Securities be secured.

ARTICLE FIVE.

Securityholders' Lists and Reports by the Corporation and the Trustee.

SECTION 5.01. The Corporation will furnish or cause to be furnished to the Trustee (a) semi-annually, not more than 15 days after each regular record date (as defined in Section 2.03) a list, in such form as the Trustee may reasonably require, of the names and addresses of the holders of each series of Securities as of such regular record date and (b) at such other times as the Trustee may request in writing, within 30 days after the receipt by the Corporation of any such request, a list of similar form and content as of a date not more than 15 days prior to the time such list is furnished; provided, however, no such list need be furnished for any series for which the Trustee shall be the Security registrar.

SECTION 5.02. (a) The Trustee shall preserve, in as current a form as is reasonably practicable, all information as to the names and addresses of the holders of Securities contained in the most recent list furnished to it as provided in Section 5.01 and as to the names and addresses of holders of Securities received by the Trustee in its capacity as Security registrar (if acting in such capacity). The Trustee may destroy any list furnished to it as provided in Section 5.01 upon receipt of a new list so furnished.

(b) In case three or more holders of Securities of a series (hereinafter referred to as "applicants") apply in writing to the Trustee, and furnish to the Trustee reasonable proof that each such applicant has owned a Security for a period of at least six months preceding the date of such application, and such application states that the applicants desire to communicate with other holders of Securities of such series or holders of all Securities with respect to their rights under this Indenture or under such Securities, and is accompanied by a copy of the form of proxy or other communication which such applicants propose to transmit, then the Trustee shall, within five business days after the receipt of such application, at its election, either

(1) afford to such applicants access to the information preserved at the time by the Trustee in accordance with the provisions of subsection (a) of this Section, or

CONTINENTAL CABLEVISION

EXHIBIT C-4

**FEDERAL COMMUNICATIONS COMMISSION
Docket No. MM 93-215**

**New England Telephone
Loan Covenants**

AS FILED WITH THE SECURITIES AND EXCHANGE COMMISSION ON APRIL 21, 1973
REGISTRATION STATEMENT NO. 33-

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY

A NEW YORK
CORPORATION
I.R.S. EMPLOYER
NO. 04-1564348

125 HIGH STREET, BOSTON, MASSACHUSETTS 02110
TELEPHONE NUMBER 617 743-9888

AGENT FOR SERVICE
J. S. RUBIN
SENIOR VICE PRESIDENT AND CHIEF FINANCIAL OFFICER
WHEX CORPORATION
225 MADISON AVENUE
NEW YORK, NEW YORK 10017
TELEPHONE NUMBER 212 370-7000
PLEASE SEND COPIES OF ALL COMMUNICATIONS TO:

MORRISON DES. WEISS, ESQ.
VICE PRESIDENT, GENERAL COUNSEL AND SECRETARY
NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY
125 HIGH STREET
BOSTON, MASSACHUSETTS 02110
RAYMOND W. WAGNER, ESQ.
SIMPSON THACHER & BARTLETT
425 LEXINGTON AVENUE
NEW YORK, NEW YORK 10017

APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC: From time to time after the effective date of this Registration Statement as determined by market conditions.

IF THE ONLY SECURITIES BEING REGISTERED ON THIS FORM ARE BEING OFFERED PURSUANT TO DIVIDEND OR INTEREST REINVESTMENT PLANS, PLEASE CHECK THE FOLLOWING BOX. 1X

IF ANY OF THE SECURITIES BEING REGISTERED ON THIS FORM ARE TO BE OFFERED ON A DELAYED OR CONTINUOUS BASIS PURSUANT TO RULE 415 UNDER THE SECURITIES ACT OF 1933, OTHER THAN SECURITIES OFFERED ONLY IN CONNECTION WITH DIVIDEND OR INTEREST REINVESTMENT PLANS, CHECK THE FOLLOWING BOX. X

CALCULATION OF REGISTRATION FEE

TITLE OF EACH CLASS OF SECURITIES TO BE REGISTERED	AMOUNT TO BE REGISTERED (1)	PROPOSED MAXIMUM OFFERING PRICE PER UNIT (2)	PROPOSED MAXIMUM AGGREGATE OFFERING PRICE (2)	AMOUNT OF REGISTRATION FEE
Debt Securities	\$400,000,000	100x	\$400,000,000	\$125,000

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series may, on terms acceptable to the Company and the depositary for such global Security, receive Securities of such series in definitive form. In any such instance, an owner of a beneficial interest in a global Security will be entitled to physical delivery in definitive form of Securities of the series represented by such global Security equal in principal amount to such beneficial interest and to have such Securities registered in its name (if the Securities of such series are issuable as registered Securities). Securities of such series so issued in definitive form will be issued as either registered or bearer Securities if the Securities of such series are issuable in either form. (Section 2.12.) See, however, "Limitation on Issuance of Bearer Securities" below for a description of certain restrictions on the issuance of a bearer Security in definitive form in exchange for an interest in a global Security.

Bearer Debt Securities. If so specified in an applicable Prospectus Supplement, pending the availability of a permanent global Security, all or any portion of the Securities of a series which may be issuable as bearer Securities will initially be represented by one or more temporary global Securities, without interest coupons, to be delivered to a depositary designated in the applicable Prospectus Supplement, for the benefit of Morgan Guaranty Trust Company of New York, Brussels office, as operator of the Euro-clear System ("Euro-clear") and Centrale de Livraison de Valeurs Mobilières, S.A. ("CEDEL, S.A.") and for credit to the designated accounts. The interests of the beneficial owner or owners in a temporary global Security in bearer form will be exchangeable for definitive Securities (including interests in a permanent global Security in bearer form), representing Securities having the same interest rate and stated maturity, but only upon written certification in the form and to the effect described under "Denominations, Registration of Transfer and Exchange" unless such certification has been provided on an earlier interest payment date. The beneficial owner of a Security represented by a temporary global Security in bearer form or a permanent global Security in bearer form may, on or after the applicable exchange date and upon 80 days' written notice to the Trustee or the global exchange agent given through Euro-clear or CEDEL, S.A., exchange its interest for definitive bearer Securities or, if specified in an applicable Prospectus Supplement, definitive registered Securities of any authorized denomination. No bearer Security delivered in exchange for a portion of a temporary global Security or a permanent global Security shall be mailed or otherwise delivered to any location in the United States. (Section 2.08.)

Unless otherwise specified in an applicable Prospectus Supplement, interest in respect of any portion of a temporary global Security in bearer form payable in respect of an interest payment date occurring prior to the applicable exchange date will be paid to each of Euro-clear and CEDEL, S.A. with respect to the portion of the temporary global Security in bearer form held for its account, but only upon receipt by the Trustee or the global exchange agent in each case of written certification, in the form and to the effect described under "Denominations, Registration of Transfer and Exchange". Each of Euro-clear and CEDEL, S.A. will undertake in such circumstances to credit such interest received by it in respect of a temporary global Security in bearer form to the respective accounts for which it holds such temporary global Security in bearer form as of the relevant interest payment date.

NEGATIVE PLEDGE COVENANTS

If at any time the Company mortgages, pledges or otherwise subjects to any lien the whole or any part of any property or assets now owned or hereafter acquired by it, except as hereinafter provided, the Company will secure the outstanding Securities, and any other obligations of the Company which may then be outstanding and entitled to the benefit of a covenant similar in effect to this covenant, equally and ratably with the indebtedness or obligations secured by such mortgage, pledge or lien, for as long as any such indebtedness or obligation is so secured. The foregoing covenant does not apply to the creation, extension, renewal or refunding of purchase-money mortgages or liens.

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REMAINDER OF PRECEDING PAGE

or to the making of any deposit or pledge to secure public or statutory obligations or with any governmental agency at any time required by law in order to qualify the Company to conduct its business or any part thereof or in order to entitle it to maintain self-insurance or to obtain the benefits of any law relating to workmen's compensation, unemployment insurance.

EXHIBIT D

CONTINENTAL CABLEVISION

EXHIBIT D

**FEDERAL COMMUNICATIONS COMMISSION
Docket No. MM 93-215**

**Economics and Technology, Inc.
Affidavit and Analyses**

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C 20554**

In the Matter of)	
)	
Implementation of Sections of the)	MM Docket No. 93-215
Cable Television Consumer Protection)	
and Competition Act of 1992:)	
)	
Rate Regulation / Cost of Service)	

STATEMENT OF DAVID J. RODDY, Ph.D.

Introduction

1. My name is David J. Roddy. I am a Vice President and Senior Economist at Economics and Technology, Inc, One Washington Mall, Boston, Massachusetts 02108. I have over fifteen years of both academic and applied experience with estimation and application of econometric and statistical models, based upon a variety of both basic and advanced methodologies involving data sets of many sizes. A more complete summary of my experience and qualifications may be found in Appendix 1 to this Statement.
2. Continental Cablevision asked me to review several economic issues raised by the Federal Communications Commission's *Notice of Proposed Rulemaking* concerning cost of service standards for cable television companies and related issues.¹ In this Statement, I address two issues. First, I reexamine the rate benchmarks to see if there are modifications that would correct errors in the basic FCC formulation while

¹ MM Docket No. 93-215 (FCC 93-353), released July 16, 1993 (the Notice).

allowing for adjustments generally based on costs. This first analysis responds to the Commission's request for comments at paragraph 72 of the Notice concerning factors which legitimately affect both cost and price that are not reflected in the current benchmark tables. Second, I examine any grounds for calculating and applying a "productivity offset" in the Commission's annual rate adjustment formula. This second analysis responds to the Commission's request for comments at paragraphs 81 through 84 of the Notice.

Summary of Results and Recommendations - Errors in the Commission's Benchmark Regression Model

3. The Commission erred in its statistical analysis by not including addressability in the regression models which created the Form 393 benchmark tables² which are part of the implementation of the Cable Act of 1992. This error can, and should, be corrected before the benchmarks are implemented. Accounting for addressability in the regression equation used in FCC's the cable television rate benchmarks improves the statistical results of the model and should have been tested in the stepwise regression technique which the Commission used. This modification would improve the basic FCC formulation while allowing for adjustments generally based on costs.
4. I included addressability in the model using the Commission's own data without modification. The results show that it is statistically significant and it indicates that systems with higher addressability have higher prices per channel. Rather than propose a completely new set of benchmark tables based on a new regression model, we can correct for the Commission's error and still use the original benchmark tables and forms. This is accomplished by estimating a supplementary regression³ which produces a table of values which are to be added to the benchmark values before they

² The Commission's statistical analysis is described in Appendix E of the Commission's *Report and Order*, MM Docket No. 92-266, released May 3, 1993.

³ This type of "constrained optimization estimator" is discussed in, for example, H. Theil, *Principles of Econometrics*, New York, NY: John Wiley & Sons, 1971.

are inserted into Lines 121 and 220 of Part II of Form 393. The value to be added varies from 0-cents for a system with 0-percent addressability to 7.4 cents for a system with 100 percent addressability. In order to correct the Commission's statistical error, these additional values, shown in the following table, would be added to the benchmark values before use in the worksheets in the Commission's Form 393.

Amount to be Added to FCC Benchmarks To Account for Percent Addressability	
Percent of Subscribers Who Are Addressable	Amount Per Channel to Add to Benchmark Value
0	\$0.000
10	\$0.007
20	\$0.014
30	\$0.021
40	\$0.029
50	\$0.036
60	\$0.043
70	\$0.051
80	\$0.058
90	\$0.066
100	\$0.074
Source: FCC Cable Operator June 11 Database, and ETI Regression Model	

5. A detailed study supporting the results cited in paragraphs 3 and 4 above entitled "The Effects of Adding Addressability to the FCC's Cable TV Benchmark Regression Model" is included as Appendix 2 to this Statement. This study was completed by me using the Commission's own survey data, the same statistical software program, and the same statistical methods. As noted above, my conclusions support slightly higher benchmark values after correction of the Commission's error.

Summary of Results and Recommendations - Errors in the Commission's Productivity Offset Proposal

6. A "productivity offset" for cable companies cannot be substantiated at this time for both empirical and theoretical reasons. The Commission requested comment on its proposal to establish a productivity offset in conjunction with the national inflation rate, GNP-PI. Standard economic analysis shows clearly that the FCC's productivity offset concept is incorrectly applied to the cable industry. There are at least four reasons for this conclusion.

First, the cable industry's cost per channel per subscriber⁴ is subject to economies that either (a) are one-time in nature and thus cannot be expected to reoccur as the industry matures and/or (b) vary greatly among different operators and regions of the country. Factors that would have to be accounted for include economies of network density, economies of scale, economies of channel capacity, and other economic and financial characteristics. It is impossible for the Commission to successfully develop one (or even several) productivity offsets; if it attempts to do so, consumers in various regions of the country will not receive the benefits of cable infrastructure modernization. The specific areas that will be disadvantaged are characterized by low population per square mile or high current cable TV penetration.

Second, accurate and reliable data to calculate a cable industry productivity growth rate is not available to the Commission. Economists are now agreed on the correct framework for the modern measurement of total factor productivity ("TFP") and a variety of sophisticated and accurate studies have been conducted in several industries.⁵ The required data items include annual data for at least the last 8 years

⁴ Since productivity is directly related to the cost per channel, we can examine the Commission's proposal by discussing factors which influence the cost of producing cable TV services. A more direct measurement of productivity is discussed in Appendix 3.

⁵ See, for example, Duke, J., D. Litz, and L. Usher, "Multifactor Productivity in Railroad Transportation", *Monthly Labor Review*, August, 1992, 49-58.

on measures of the economic concept of the capital stock, the number of employees, and purchases of materials and intermediate services. An accurate measure of the capital stock, for example, includes inflation adjusted values for past investment by asset category by year including economically correct depreciation rates, tax rates, and tax depreciation rates as well as an overall correct industry rate of return.⁶ As has been noted by the Commission, the required data is just not available in the Cable TV industry.

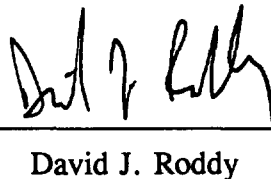
Third, past applications of a productivity offset program by the Commission in telecommunications provide no guidance or support for such a program applied to the cable industry. As stated by the Commission, the Local Exchange Carrier (LEC) price caps program does use a productivity offset in its annual rate adjustment program. This initial price caps plan for these telecommunications carriers was premised on the assumption that some productivity offset could be broadly defined so as to apply to all of the large, or "Tier I" carriers. This assumption was not, of course, subjected to testing, because the Commission lacked the necessary carrier-specific data to do so. More recent evidence suggests that there is no single productivity offset that is applicable to all carriers in the industry. An analysis of the overall economics of the cable industry reveals that there is even more disparity than for telecommunications carriers. Thus a single productivity offset (or even several) is doomed to failure.

Finally, if the Commission insists on using the productivity offset approach, available data show that cable productivity trends using rough data on 'labor productivity' for the last 11 years show that the applicable value is essentially zero. Thus, even if the Commission were to adopt the productivity offset concept, the available data indicate that the correct value would be zero.

⁶ See, for example, Hulten, C. "The Measurement of Capital", in E. Berndt and J. Triplett, eds., *Fifty Years of Economic Measurement*, Chicago: University of Chicago Press, 1990.

7. A detailed study supporting the results cited above entitled "Analysis of the FCC's Cable TV Productivity Offset Proposal" is included as Appendix 3 to this Statement. The results of this analysis show that, for the reasons stated above, the Commission should reject the productivity offset concept as inapplicable to the cable TV industry and inappropriate to implement the Cable Act.

I hereby affirm that the matters discussed in the foregoing document are true to the best of my knowledge and belief.



David J. Roddy

Appendix 1

STATEMENT OF EXPERIENCE AND QUALIFICATIONS OF DR. DAVID J. RODDY

1. I received a Ph.D. in Economics at the University of Wisconsin, Madison in 1980, an M.A. in Public Policy and Administration from the University of Wisconsin, Madison and a B.A. in Economics from the University of Illinois, Urbana. My fields of study include Regulated Industries, Econometrics, Statistics, and Finance. I am a member of the American Economic Association and the American Statistical Association.

2. From 1983 to the present time I have been employed as a consultant to Economics and Technology, Inc. and then successively through other positions to my current position as Vice President and Senior Economist. In these positions I have conducted major studies of telecommunications issues, including productivity, incentive regulation & regulatory reform, network modernization, intercompany cost comparisons, econometric demand and cost models, statistical market research, cost allocation, and minimum cost network designs. I have prepared continuing analyses of various issues related to the implementation of the LEC Price Caps program, including recent comments on various statistical models submitted by the LECs to estimate the effects of implementation of FAS-106 post-retirement benefits accounting changes in FCC Docket 92-101. I have also prepared detailed LEC productivity studies in several states and have analyzed evidence on telecommunications industry productivity. In the last year, I have completed a variety of economic and statistical studies related to the re-regulation of the Cable TV industry.

3. From 1981 to 1983, I was a Senior Economist with Data Resources, Inc., a nationally known consulting firm. There, I made contributions to DRI's well-known 1200 equation forecasting model of the US economy. I also developed econometric and statistical models for clients in the telecommunications and automotive industries. In addition, I have performed analyses of various cost methodologies used by telephone companies to determine costs and to set rates; and to estimate econometric telecommunications demand models to determine estimates of repression and stimulation of demand as a result of price changes.

4. From 1978 to 1981, I was an instructor and later an Assistant Professor at the Business School at the University of New Hampshire, Durham, teaching graduate and undergraduate courses in Economics, Econometrics, and Quantitative Methods. From 1972 to 1974, I was a staff economist with the Antitrust Division, U.S. Department of Justice, where I conducted economic and financial analyses on antitrust cases and investigations in both regulated and unregulated industries. In 1974, I received the Justice Department's Superior Performance Award.

5. I have conducted studies concerning a wide range of econometric and statistical issues, some of which are represented in the following papers:

Roddy, D. "The Demand for Video Dialtone Services Among Current Cable TV Customers", Draft, July 15, 1993.

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Roddy, D. and R. Mayer, "Consumer Interest in New Communications, Information, and Entertainment Services: Statistical Analysis of New Survey Data", *Presented at the Meetings of the Southeastern Association of Regulatory Commissioners*, Orlando, Florida, June 15, 1993.

Roddy, D. "Analysis of the Home Video Game, Cable TV, and Personal Computer Market Segments", Draft, August 16, 1993

Roddy, D., Economics and Technology, Inc, Theodore Barry and Associates, and Scott, Madden and Associates, *Potential Performance Gains of New York Telephone*, for the New York Public Service Commission, November, 1992. (Statistical and Econometric Chapters)

Roddy, D., *Analysis of FAS 106 Effects Under Price Caps: A Test Case for LEC Price Cap Regulation by the FCC* (with Page Montgomery), submitted July 1, 1992 in FCC Docket 92-101, Treatment of Local Exchange Carrier Tariffs Implementing State of Financial Accounting Standards, by the Ad Hoc Telecommunications Users Committee and the International Communications Association.

Roddy, D., E. Simos, and J. Triantis, "A Two Output, Multi-Input Model of Exogenous and Endogenous Technological Change of the U.S. Economy," *Economic Notes*, Vol. 14, No. 2, 1985.

Roddy, D. and P. Matthews, "A Monthly U. S. Forecasting Model Using the Vector Autoregression Technique," *Data Resources Review of the U.S. Economy*, November, 1981.

Roddy, D., D. O'Reilly, and B. Hui, "Forecasting Economic Activity with a Multiple Time Series Model of the U.S. Economy," *Data Resources Review of the U.S. Economy*, August, 1981.

Appendix 2

The Effects of Adding Addressability to the FCC's Cable TV Benchmark Regression Model

David J. Roddy¹

Summary

The Commission erred in its statistical analysis by not including addressability in the regression models which created the Form 393 benchmark tables which are part of the implementation of the Cable Act of 1992. This error can, and should, be corrected before the benchmarks are implemented. Accounting for addressability in the regression equation used in FCC's the cable television rate benchmarks improves the statistical results of the model and should have been tested in the stepwise regression technique which the Commission used. This modification would improve the basic FCC formulation while allowing for adjustments generally based on costs.

We included addressability in the model using the Commission's own data without modification. The results show that it is statistically significant and it indicates that systems with higher addressability have higher prices per channel. Rather than propose a completely new set of benchmark tables based on a new regression model, we can correct for the Commission's error and still use the original benchmark tables and forms. We do this by estimating a supplementary regression which produces a table of values which are to be added to the benchmark values before they are inserted into Lines 121 and 220. The value to be added varies from 0-cents for a system with 0-percent addressability to 7.4 cents for a system with 100 percent addressability.

Introduction

The Commission's benchmark formula is shown in Appendix E of the May 3, 1993 *Report and Order* on cable rate regulation, as:

$$(1) \quad \text{LNP} = 2.4448 + 7.3452 (\text{RECIPSUB}) - 0.8878 (\text{LNCHAN}) + 0.1006 (\text{LNSAT}) - 0.0939 (\text{ABC})$$

where:

LNP	= natural logarithm of the benchmark rate per channel;
ABC	= 1 if the community unit belongs to one of the categories comprising the statutory definition of "effective competition" otherwise 0;
RECIPSUB	= 1 / number of households subscribing to the cable system;

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LNCHAN	= natural logarithm of the number of channel in use in all regulated tiers of service;
LNSAT	= natural logarithm of the number of satellite-delivered channels on all tiers of service.

The Adjusted R Squared of the model is 0.628 and the number of observations is 377. This regression model is described at paragraphs 25 through 34 of Appendix E of the May 3, 1993 Order. The Commission used this regression model to create all of the Benchmark Tables used in Part II of Form 393.²

Omitting variables which should be entered in a regression causes serious problems in the model and the validity of its results. Such an omission biases the results of the regression model.³ The Commission has noted the possibility that important variables which legitimately affect both cost and price might appropriately be added to the regression model in order to improve its accuracy.⁴

One such variable is the addressability of the individual system. Addressability is the addition of functionality to the cable system allowing the operator to implement specific service features at individual subscriber locations or addresses. Addressability requires added capital investment in cable headend, distribution and customer premises equipment. These costs may be incurred over several years as systems are upgraded from older technology to addressable technology.

We would expect that systems with higher addressability would have higher costs and hence higher prices per channel. If such a variable is omitted from the model, the effect is to penalize systems with high addressability.⁵

2. In its July 30, 1993 release of Form 393 to be used with cable rate submissions, the Commission eliminates the ABC variable and subtracts .0939 from the Appendix E constant term of 2.4448. This produces a constant term of 2.3509 in the Form 393. Both methods produce identical results.

3. Any number of standard texts, such as Greene, William H., *Econometric Analysis*, New York, NY: MacMillan Publishing Company, 1990; Theil, Henri, *Principles of Econometrics*, New York, NY: John Wiley & Sons, 1971; and Wonnacott, Ronald J. and Wonnacott, Thomas H., *Econometrics, Second Edition*, New York, NY: John Wiley & Sons, 1979 would support this principle.

4. This possibility is reflected in paragraph 72 of the July 15, 1993 *Notice of Proposed Rulemaking* on cost of service standards for the cable industry (MM Docket 93-215), where the Commission noted that, "Operators who could demonstrate the existence of such factors might then be permitted to charge rates equal to the benchmark plus an 'add-on' amount attributable to those extraordinary factors."

5. The Commission equipment basket cost rules, in Part III of Form 393, allow cable operators to differentiate the costs of addressable and nonaddressable subscriber converters. This feature, however, does not actually recognize the costs of addressability, because the gross costs associated with converters and other cable equipment are simply deducted from Part II of the form used to calculate benchmarks. The adjustment proposed here, then, does not require any change in the Part III equipment costing process.

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Corrected stepwise regression results show the error of excluding addressability

We tested to see whether the percentage of addressable subscribers in the systems in the Commission's sample would have a statistically significant effect on price. This variable is readily available in the FCC data released to the public.⁶ We define the percent addressable as:

$$(2) \quad \text{PADDRES} = 100 \text{ times (number of addressable subscribers / number of households subscribing).}$$

We calculate the variable from the Commission's database of 377 systems as 100 times S2_ASUBS divided by S2_HHSUB.⁷

In the next step of the analysis, we duplicate the stepwise regression procedure that the Commission stated that it used in paragraph 26 of Appendix E with the same SPSS software that the Commission used. In brief, stepwise regression "automatically" selects variables to be used in the model based on their importance in explaining the variation of prices per channel in the sample. The researcher's role is to specify a group of variables, such as number of channels, subscribers, satellite channels, to be considered for addition to the model. In our analysis, we allow addressability to enter as well as all of the Commission's variables specified in (1) above.

Our stepwise regression results showed clearly that addressability entered the model in a statistically significant manner. In fact, it was the second most important variable to be entered after the number of channels. The t statistic on percent addressability is 3.72 which, since it is greater than 1.96, indicates a highly significant and relevant variable. The Adjusted R Squared from this new model is 0.636 -- greater than that for the Commission's Appendix E model shown in (1) above.⁸

Thus, we have used the Commission's data without modification, the same software, and the same regression modeling technique. We allowed addressability to be added to the model and it was automatically selected by the computer software as one of the most significant variables to enter the model. We conclude that addition of the percent addressability to the model was not tested by FCC, despite the fact that it was one of the first items asked for in its cable system

6. We used the revised database designated as "CABLER2.EXE" and dated June 11, 1993. With this database and using SPSS software, we duplicated the Commission's Appendix E statistical results exactly.

7. The references are shown in FCC's "Release of Data from Cable TV System Operators Rate Structure Questionnaire," February 24, 1993, Schedule 2.

8. All of the other variables are also statistically significant as well.

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questionnaire. If the FCC had allowed the software to consider adding this variable, it would have achieved identical results to ours.

The "Benchmark Plus" model

It is clear that addressability has an important effect on cost and hence price. In order to implement the add-on effect of addressability and preserve the many forms that the Commission has already created, we adopt a "supplementary regression" approach.

In this approach, we take the residuals of the Commission's equation in (1) and use those as the dependent variable in a regression on addressability. This econometric procedure is in the class of constrained estimators. It minimizes the sum of the squared residuals of the full model (including addressability) subject to the constraint that the parameters of the Commission's model, in Appendix E of the *Report and Order*, cannot change. The residuals are the "unexplained" part of the model, i.e., that portion of price variation which cannot be predicted using the variables already in the model. We are thus attempting to determine whether or not addressability can help further explain the variation in price per channel in the Commission's sample of 377 systems. If addressability can help explain the residuals then it is clearly a factor that will improve the model, and, given the stepwise regression results reported above, one should expect that it will be a statistically important variable.

The results of this supplementary regression model are:⁹

$$(3) \quad \text{RESID} = 0.0009 (\text{PADDRES})$$

where

RESID = unexplained part (residuals) from the FCC model in (1) above.

The t statistic on percent addressability is 2.81. Since the t statistic is greater than 1.96, we conclude that addressability is an important omitted variable and that it definitely has a statistically significant effect on price. It is thus obvious that addressability is a reasonable and important "add on" amount which affects both cost and price per channel. This is exactly consistent with the results of the stepwise regression which we reported in the previous section. The supplemental model also shows that addressability meets not only the standard statistical tests discussed above but also the intent of the Commission regarding additional factors which would justify rates higher than the benchmark tables.¹⁰

9. We omit a constant term here because there is already a constant term in the model in (1) above.

10. See footnote 4 above.